

Evaluation of Task Adaptation Luminance (ETAL)

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ETAL

Evaluation of Task Adaptation Luminance

- ETAL determines task luminance required for a specific visual adaptation.
- Or ... identifies how much light is necessary to see a task under different lighting conditions.



Why Was ETAL Developed?

- IESNA developed consensus recommendations for outdoor lighting.
- Many of these recommendations are inconsistent and the values are not based on vision research.
- ETAL provides visibility-based lighting values for a range of adaptation levels.



How Is ETAL Calculated?

- Spatial frequencies are calculated on a digital image to show the contrasts in an outdoor scene.
- Computer filters are inserted to simulate typical adaptation levels.
- ETAL then simulates different visual acuity requirements for specific task performance under different adaptation levels.



In Other Words ...

- In order to perform a task, we need a certain amount light on the task.
- If we have adapted to low lighting levels, we need less light to see the task.
- The ETAL procedure will determine the task lighting levels under different levels of adaptation.



How Do Adaptations Change?

- Glare changes adaptation level.
- High light levels also change adaptation level.
- Using ETAL, IESNA technical committees can optimize ways to maintain an adaptation level. This enhances visibility and decreases the time needed to see.



Step 1: Identify Visual Tasks

- IESNA committees will determine visual tasks for typical outdoor areas.
- Areas include roadways, parking lots, walkways, outdoor retail, signs, facades, and roadways.





Step 2: Analyze Spatial Frequencies

- Analyze a digital image of a daytime outdoor scene for spatial frequencies.
- Low spatial frequencies represent large tasks or gradual variation, like a wide grass median next to dark asphalt.
- High spatial frequencies represent small tasks or sharp lines, like white striping on dark asphalt.



Step 3: Simulate Different Levels

- Simulate lower adaptation levels by applying computer filters to the scene.
- Adjust the analysis to determine how much light someone will need to “see” a task under different lighting conditions.



ETAL Results

- In typical outdoor scenes, required luminance(s) for specific task performance will be developed for different adaptation levels.
- ETAL responds to the effects of disability glare — adaptation level increases and task contrast decreases.



How Are ETAL Results Used?

- Task luminance levels are established for different adaptation levels.
- Adaptation levels relate to specific environmental zones (E1 - E4).



How Are ETAL Results Used?

- In an E1 zone, avoid glare, yet in an E4 zone, brightness is acceptable.
- When lighting levels and adaptation zones are established, outdoor lighting models will show appropriate lighting power densities (LPDs).



The Advantages of ETAL

- Gives a visibility basis for outdoor lighting power densities.
- Disability and discomfort glare tolerances are based on vision science.

